IHS Best Practices Model
Diabetes and Foot Care

Diabetic Foot Care Overview

- Lower extremity amputation, as a complication of diabetes, occurs in the Native American population at a rate 2-3 times that seen in the general diabetic population. These rates are significantly higher for patients with end stage renal disease. [1, 2]
- The key to reducing amputations is prevention of foot ulceration, inasmuch as the vast majority of amputations are preceded by diabetic foot ulceration. [4]
- Risk factors for ulceration include the following:[1,2,4,6,]
  - Neuropathy
  - Peripheral vascular disease
  - Foot deformity and altered biomechanics
  - Prior history of ulceration or amputation
  - Duration of diabetes
  - Hyperglycemia
- The majority of ulcerations in the high-risk foot are caused by poorly fitting shoes and accidental minor trauma [7]. Hence preventing minor trauma represents a important opportunity for interrupting the causal pathway to amputation.
- Studies have shown that amputations can be decreased by institution of a foot care program that includes:[1,3,4,5]
  - Education and self care
  - Screening and Risk Categorization
  - Protective footwear
  - Routine podiatry care
  - Wound care
- Prompt, appropriate treatment of the diabetic foot ulcer is critical for limb preservation. Basic principles of ulcer care include the following: [8,9]
  - Optimizing blood flow to the foot
  - Reducing pressure at the ulcer site
  - Debriding frequently
  - Providing good wound healing environment
  - Controlling infection

Ulcer care may be provided on either an out-patient or in-patient basis, depending on wound severity.

Basic Footcare Program

It is recommended that a foot care program at any site be in compliance with the IHS standards of care, which are: comprehensive foot examination annually and visual foot check with every clinic visit. [10]. The program should also incorporate patient education, screening and risk categorization, preventive care, and wound management.
Patient education should be completed on the following topics: self-care, footwear selection, fitting and utilization, preventing minor trauma by clearing walking spaces and use of night-lights, and recognition of conditions that require professional care. Culturally appropriate educational materials should be used. Patient understanding of educational topics should be assessed.
Annual comprehensive screening examination should include the following components [1,8,9]:

- The 10-gram monofilament should be used to assess the level of protective sensation.
- Pedal pulses should be palpated. Other signs of peripheral vascular disease, such as pallor on elevation, rubor on dependency, and trophic changes of the skin and nails. Doppler can be used to assess ankle-brachial indices, if available or indicated.
- Documentation of significant foot deformities such as hallux valgus, hammertoes and Charcot neuroarthropathy should be noted.
- History of prior infection, ulceration, or amputation should be noted in the medical record.
- Current footwear should be inspected for appropriate fit and style. Footwear should be appropriate to the level of risk identified. Patients will likely need several types of footwear for different functions including work, all weather, casual or formal occasions, as well as slippers for indoors.

Each patient should be assigned a category of risk based on the results of the screening exam. This risk categorization will dictate the level of follow-up care. Low risk and high-risk patients should be identified using the following suggested criteria:
Low risk criteria

- + sensation with The 10-gram monofilament
- adequate blood flow
- no significant foot deformity
- no prior h/o infection, ulceration or amputation

High risk criteria

- loss of protective sensation
- decreased blood flow
- presence of significant foot deformity
- prior history of infection, ulceration, or amputation
- ESRD

Preventive care should be provided to all high-risk patients. Low risk patients should receive care as needed. Preventive care should include the following components:

- nail care
- callus care

- skin care and
- protective footwear
    - Commercially available shoes with proper design characteristics may be adequate for low risk patients.
    - Added depth shoes should be provided for high-risk patients who have sensory loss, vascular insufficiency, and/or mild to moderate foot deformity. A custom molded inlay may be added to these shoes to further enhance pressure distribution.
    - Custom molded shoes with custom inlays should be provided for high-risk patients with advanced deformity.

Management of wounds should begin with assessing the following criteria.

- Lower extremity blood flow
- Wound dimensions
- Quality of the wound bed and edges
- Surrounding erythema/cellulitis
- Mechanism of injury
- Penetration to deep structures
- Signs of systemic infection
- Glycemic control
- Other health risk factors such as alcohol and tobacco use

Based on the assessment of the above parameters the wound should be classified as simple or complex, based on the following criteria:

Simple Ulcer

- Wound dimensions less than 2 cm in diameter and less than 0.5 cm deep
- Periwound cellulitis less than 2 cm and no ascending infection
- Temperature less than 38 degrees C
- WBC less than 12,000
- No deep space infection
- Pulses are present and ischemic symptoms are absent

Complex Ulcer

- Wound dimensions > 2cm in diameter and > 0.5 cm deep
- > 2 cm periwound cellulitis or presence of ascending infection
- Temperature > 38 C
- WBC > 12,000
- Presence of deep space infection
- Absent pedal pulses or the presence of ischemic symptoms
- Ulcers which fail to improve after 2 weeks of management

Management of simple and complex ulcers should be completed in accordance with the following general guidelines:

Simple Ulcer

- Weekly debridement and wound measurement.
- Limit weight bearing (bed rest, wheelchair, crutches, healing shoe, total contact cast)

- Daily dressing changes, with use of specialized dressing materials as needed to provide appropriate wound healing environment.
- Use of oral antibiotics in the presence of signs and symptoms of infection after obtaining appropriate wound cultures (avoid surface swabs).
- Patient education to reinforce the care plan.
- Home care follow-up every 1 to 3 days to assess compliance to care plan.
- Medical follow-up in clinic weekly to monitor healing and modify care plan as needed.

Complex Ulcer

- Wide surgical debridement including cultures of excised tissue/bone.
- Daily post-operative dressing changes, using appropriate dressing materials to provide optimal wound healing environment.
- Strict enforcement of non-weight bearing status.
- Optimize metabolic control.
- Parenteral antibiotic therapy for deep structure infection (abscess, osteomyelitis).
- Patients with signs or symptoms of ischemia should proceed to definitive vascular evaluation and treatment.
- Patient education to promote required self-care practices following hospital discharge.
- Post-hospital care plan to include frequent out patient visits for wound care and monitoring of progress, with modification of plan as needed.

Once a foot ulcer has been healed, that patient should be considered at high risk for re-ulceration, and vigilant follow-up with special attention to preventive measures is necessary.

Foot Care Plan Providers

It is understood that there will be local variation in types of practitioners providing the components of footcare, depending on resources, preferences and personnel availability. The following is a list of providers that should be considered on a local level for establishment and/or expansion of a footcare program:

- **Podiatrist**: A surgically trained podiatrist, with a strong background in management of diabetic foot complications, can provide and manage a continuum of care. These services could include screening and risk assessment, routine care, prescribing and/or dispensing protective footwear, management of diabetic foot ulcers, management of foot infections (including incision and drainage and local amputation as needed) and correction of significant deformity. These services could be provided by a full-time podiatrist, a podiatrist shared between multiple programs, or a podiatrist contracted from the private sector.
- **Primary Care Provider**: The primary care provider should be trained to provide screening, risk categorization and appropriate referral. Some may also wish to provide routine foot care, and management of simple foot ulcers.
- **Wound Care Specialist**: These individuals may be physicians and podiatrists as well as nurses or physical therapists with specialized training in the management of acute and chronic wounds. These providers could be used in management of foot ulcers, including debridement, use of special wound care modalities and off-loading of ulcer sites.

- **Certified Pedorthist**: These individuals have received specialized training in fabricating, fitting and dispensing protective footwear, including extra depth shoes, custom inlays, and custom molded shoes. They also can provide shoegear modification such as lifts, rocker soles and rigid shanks. Other prescription items such as external braces and ankle foot orthoses could be fabricated and dispensed.
- **Community Health Representatives / Outreach Workers**: These individuals may be trained in patient education and assessment. They could be a valuable resource for screening and referral. They may also be trained to provide basic routine footcare on low risk patients.
- **Other Contracted Personnel**: Orthopedic, general and vascular surgical specialists should be available for referral, in the event that the needed services are not available at the service unit level.

Levels of Care

A foot care program focusing on a Basic level of care would contain the following components:

- Screening
- Risk Categorization
- Referral mechanism
- Educational Components

A foot care program focusing on an Intermediate level of care would contain all the components of the Basic level plus the following components:

- Follow-up of patients based on risk category
- Provision for or dispensing of protective footwear
    - Routine footcare
    - Simple ulcer management

A foot care program focusing on a comprehensive level of care would contain all the components of the Basic and Intermediate levels plus the following components:

- management of complex ulcers
    - Surgical debridement
    - Amputation as needed
- corrective surgery
- Vascular reconstructive surgery
- Advanced Wound care technologies

Goals and Objectives

The overall goal of a footcare program is to prevent lower extremity amputation. his will necessitate initial and on-going training for those who are providing care.

Objectives

- Basic
    - Annual screening of the diabetic population to determine risk category and appropriate referral
    - To provide culturally and educationally appropriate self care education

- Intermediate
  - Incorporate the objectives of the basic level
  - Formulation of an on-going care plan based on risk categorization
  - Provide components of care to manage simple ulcers
    - debridement
    - dressings and compressive stockings
    - off-loading
- Comprehensive
  - Incorporate the objectives of the basic and intermediate levels
  - Provide full spectrum of care to facilitate limb salvage

Target Population

The target population for a footcare program would include the total diabetic population, with special emphasis on early intervention aimed at ulcer and amputation prevention for those identified as high-risk patients.

Strategies For Successful Implementation

Interventions targeting reduction of foot problems are effective only if they available and are utilized on a consistent basis. Factors that are associated with successful implementation include:

- Team Coordination. This can be either a Foot care Team or subgroup of the facility diabetes team. There should be a designated Coordinator or "champion"
- Diabetes Registry listing foot risk status that can be used to track and recall patients.
- Practice Guidelines. The local team should review guidelines, such as those presented in this document. Consensus should be reached on how to customize the guidelines meet to the needs and resources of the community.
- Flowsheets, Standardized Forms, Chart reminders, and standing orders should be used to prompt providers to offer the care described in the guidelines.
- Evaluation and Feedback. Process and outcomes should be reviewed and incorporated into a continuous quality improvement plan.

Program/Progress and Outcome Indicators

The following topics may be utilized to evaluate the effectiveness of the footcare program, consistent with the level of care provided:

- Has the number of diabetic patients receiving foot screening increased?
- Is there an increase in the number of high-risk feet identified?
- Are appropriate referrals being completed?
- Has the "no-show" rate for clinic appointments decreased?
- Has there been a decrease in the number of patients presenting to the Emergency Room with complex foot ulcers?
- Is there a decrease in time interval between presentation with a complication and definitive referral visit?
- Has the number of high-risk patients obtaining protective footwear increased?
- Is the percentage of patients with amputations who received consistent routine footcare prior to the event decreasing?
- What are the baseline and follow-up annual amputation rates?

Clinical/Community Assessment

The following issues should be evaluated to assess the current level of footcare services and determine need for expanded foot care services.

- What percentage of the diabetic population is receiving annual foot screening?
- What is the level of intervention for identified high-risk population?
- Is protective footwear available?
- Is routine footcare available?
- Are wound care services available?
- Are surgical services available?
- Is information management technology available to facilitate proper tracking of follow-up care?
- Do you have personnel willing and trained to perform services?

Technical Review of Proposals

The following topics may be included in technical review of grant proposals as they are submitted.

- Definition of the scope of the problem as perceived by the community or documented by clinical data
- Definition of specific areas to be addressed
- Outline of plan to address problem
- Need for additional personnel
- Need for procurement of equipment
- Need for specialized training for providers
- Definition of program progress and outcome evaluation tools
- Plan to ensure staff competency to perform assigned functions
- Demonstration of understanding of influence of overall diabetic control on foot complications.

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Suggested Reading

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Useful Web Links

IHS Diabetes Program	www.ihs.gov/medicalprograms/diabetes
Feet Can Last a Lifetime	www.niddk.nih.gov/health/diabetes/feet/feet.htm
LEAP Program	www.bphc.hrsa.dhhs.gov/leap
Amputation Prevention Global Resource Center	www.diabetesresource.com/